
Math Matters

The Cornell Mathematics Department Newsletter

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LETTER FROM THE CHAIR, Peter Kahn

This year has again proved to be very busy for the Department, with a large number of research and teaching visitors coming from as far away as China and Malaysia and bringing with them a wide spectrum of talent and interests. In addition to regular colloquia and more informal but regular luncheon gatherings, the Department hosted the thirty-second annual Topology Festival, while our affiliate, the Mathematical Sciences Institute, hosted the Algorithmic Number Theory Symposium.

Our two newest additions to the curriculum, our instructional computer facility and an honors seminar, both got off to auspicious starts this spring. The computer facility, an attractive laboratory that can accommodate sections of 25 students, is equipped with Macintosh computers and a variety of display devices and printers. A number of courses have scheduled regular class sessions in the lab, and we expect this num-

ber to grow in the coming year. In the honors seminar, students covered an astonishingly broad and interesting collection of topics under the expert tutelage of Professor John Hubbard. I personally attended a number of these student presentations and was delighted by the interest and enthusiasm of the class. The seminar will be given again next spring by Professor Robert Connelly. More on this in the next issue.

We are also very proud that Professors Robert Strichartz and Maria Terrell have just been awarded an NSF REU grant (Research Experiences for Undergraduates). The grant will support a number of undergraduates from other institutions this summer, as well as some from Cornell. These students will work with faculty on research projects. The sort of research, cooperative learning, and expressive skills developed in these summer research projects have proved to be very valuable not only for majors planning a career in one of the mathematical sciences, but also for majors

going on into any of the professions or business. We hope this activity can be expanded over the coming years.

It goes without saying, but alas must be said, that we continue to find ourselves under serious financial pressure. Both the University and the federal government have not maintained levels of support that allow us to pursue adequately all of our traditional programs. Support of our undergraduate club, our teaching and research colloquia, and our library are seriously deficient, and we would welcome any and all contributions (see the last page of this newsletter).

Finally, I want to urge you to remain in touch, to let us know about events important to you. We would like to share these with all our readers. We do try to maintain a current address list, so please keep us up to date with that. Is there a math major, grad student, or faculty member who you would like to get in touch with? Let us know. We'll try to supply you with an address.

New Math Lab Opens

Ever want to *see* that fold singularity? Quickly gain *intuition* on the parameter dependence of a new model? *Watch* a power method for eigenvalues converge? Or *fail* to converge? Or do computer explorations for an undergraduate research project without being thrown off the computers because of competition with people writing term papers?

All these things and many more became much more accessible this semester with the opening of the Department's new Instructional Computing Lab. The lab was launched by a generous gift from a Cornell alumnus and has been augmented by an NSF award and support from the College of Arts and Sciences. Located in Stimson hall with a picture-perfect view of the Arts Quad, the lab consists mostly of computationally powerful Macs just dedicated to mathematical use. Supported by a wide screen projector, color printing, Unix workstations, network connectivity, and trained consultants, the lab is ready to play an increasing role in undergraduate instruction.

This semester saw lots of startup activity. The statistics group in the Department had long been using DataDesk software in the introductory Math 171 course, and weekly section meetings moved immediately to the lab. Students are now able to use the "professional version" with much improved graphics and other capabilities.

Another class which met in the lab regularly was Professor David Henderson's "Mathematics in Perspective" (Math 408). A range of software from graphing programs to Geometer's Sketchpad to fractal display programs were used in the course. Class meetings in Stimson 206 were not usually dedicated hour long computer labs; instead, they were often lecture discussions where student experiments became launching and solidifying points for issues the course always wanted to cover.

The biggest single user of the lab was undergraduate math major William Dickinson, who was doing his honors senior thesis with Professor Bob Connelly. Studying the dynamics of some kinds of "greedy" algorithms for circle packing on tori, Dickinson sometimes harnessed all the machines in the

lab for weekend-long experiments, and then worked at explaining some of the new and conjecturally optimal packings discovered. The most popular software in the lab this semester was probably the locally produced, award winning, Analyzer* whose development was directed by faculty member Beverly West and Lab Associate Director Doug Alfors. There was a lot of experimentation with this easy-to-use graphics (and much more) software in first- and second-year calculus classes, as well as courses like Math 408. Some TA's such as Rob Manning held regular office hours in the lab so that use could be blended in with regular discussion of what was happening in the course.

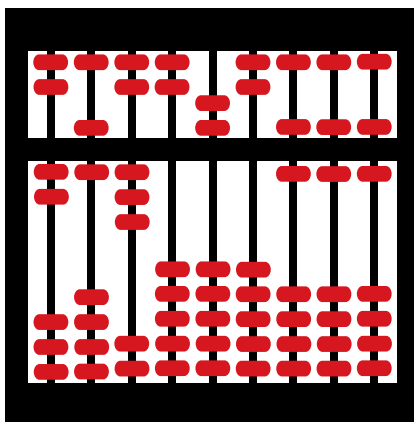
Thanks to an innovative approach of Visiting Professor Bob Jamison, the lab was especially busy the last two weeks of the semester. His course, Math 213, is a broad topic sophomore level course primarily for

life science majors. Students were asked to select from a range of models and software, and then explore in groups keeping records of what surprises they found as well as answering "guiding" questions so they would focus on core issues. One of the most popular projects among the groups was working with the "Planets" program of Mac Math, looking at stability, sensitivity, and step size issues for example. (MacMath was developed under the supervision of Beverly West and Professor John Hubbard, and is now sold by Springer Verlag.)

Thanks to Avery Solomon, Geometer's Sketchpad was available much of the semester in the lab. Among other things, its great capability for bringing to life theorems in perspective geometry made for some very enjoyable classes and lectures in the lab.

The lab is still in its infancy. People are now planning for greater summer and fall use. This summer there are ten REU students participating in the Department's undergraduate research program, which will be directed by Professor Bob Strichartz. This spring, a group of faculty members led by Professors Lou Billera and Ken Brown received an NSF grant which will be used to bring more powerful graphics workstations and PowerPC capabilities to the lab.

With all the interest nationally and the talent locally, there's great potential for departmental experimentation and growth in the new lab. Everyone is enthusiastically welcomed to participate!



New Faculty

Several new faculty members will be joining the Mathematics Department this fall.

Fusun Akman (Ph.D. Yale University, 1993) is an expert in algebra and its applications in Physics. She joins us as an H.C. Wang Assistant Professor after completing her postdoc at UC Berkeley.

Zhen-Qing Chen (Ph.D. Washington University, 1992) comes to us as an Assistant Professor after a postdoc at UC San Diego. His research interests are in probability theory and partial differential equations.

José Escobar (Doctor (h.c.) Universidad del Valle 1992; Ph.D. UC Berkeley, 1986) was an Associate Professor at Indiana University and joins our department as a Professor. His scholarly activities are in partial differential equations, in particular their applications to geometry.

Sa'ar Hersonsky (Ph.D. University of Illinois at Chicago, 1994) researches geometric group theory. He comes to us as an H.C. Wang Assistant Professor.

Graduates

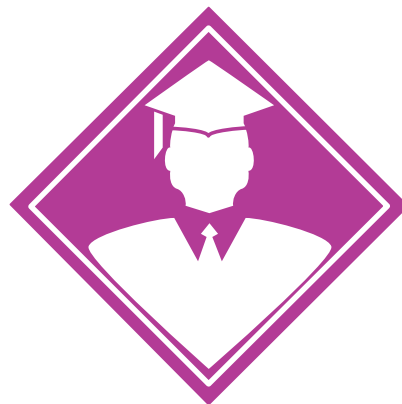
The following students have earned a Ph.D. in mathematics:

Heike Dengler
William Kalies
Sungchul Lee
Susan Lee
Jiaqi Luo
John Parker
Dierk Schleicher
Geng-qiang Zhou

The following students have earned a B.A. in mathematics, awarded in either January, May, or August 1994:

Mohammed Al Mbaid
Scott Lee Arouh
David E. Baron
Felipe A. Barrueto
Nicholas Bowden
Tracey Ellen Chabot
Emmanuelle Delannoy
Susan den Outer
William Dickinson
Shannon Eastman
Edward Eigel
Joanne Galinsky
Jessica Evelyn Green
Eileen C. Hannigan
Paul Hargrove
Elizabeth Anne Hingley
William S. Hinkle
Michael Spencer Hodes
Christos Ioannou
MacDonald Hall Jackson
Noel N. Jones
Kevin Tyler Kennedy
Daniel John Kheel
Seth Barnett Klugherz
Gnanamba Kondagunta
Semyon Kruglyak
William Daniel Kuhnert
Sean LaVerne

Christopher Lazzerini
Jingyee Lim
Liana Michelle Lorigo
Ripley Graeme MacDonald
Michael Alan Marsh
Demetrio Antonio Muñoz
Chuan Thanh Ngo
Quang Ngoc Nguyen
Michael J. Parker
Aaron Peromsik
Eric Charles Resnick
Richard Roberts
Carrie Lynn Rowland
Jennifer Susanne Rusek
Jeremy W. Schulman
Jianbo Shi
Jonathan Soule
Charles J. Souza
Jeremy David Sperling
Philip Aaron Tinari
Christopher Twirbutt
Wendy W. Wang
Gwendolyn M. Watts
Wei Liang Winston Yean
Tong Zhang
Matthew Thomas Zimmer



Olivetti Club

The Spring 1994 Olivetti Club gave nine graduate students the opportunity to talk about their interests; the participants and talks included Robert Ghrist ("Maps, Braids, and a Theorem of Thurston"), John Parker ("Gabor Transforms, Wavelet Transforms, and Time-Frequency Analysis"), Jim Coykendall ("A Look at Formal Power Series Rings"), Wicharn (Charlie) Lewkeeratiyutkul ("Nets and the 'Limits' of Sequences"), Ed Bueler ("How to do Topology by Analysis"), Jeff Baggett ("Non-normality and Pseudospectra"), Hal Schenck ("Groebner Bases for Moduls and Computing Free Resolutions"), Rodney Lynch ("Monomial Orders and Groebner Bases"), and Shu-Yen Pan ("Compact Riemann Surfaces, Projective Curves, and Algebraic Function Fields").

Visiting Professor Michael Pang described his work on elliptic equations ("Eigenfunctions of Some Planar Domain with Fractal Boundaries"), and Professor Ken Brown explained his newest interest ("Introduction to C^* Algebras") in the best-attended talk of the semester.

The Olivetti Club was organized this semester by graduate student Ed Bueler.

Notable Achievements

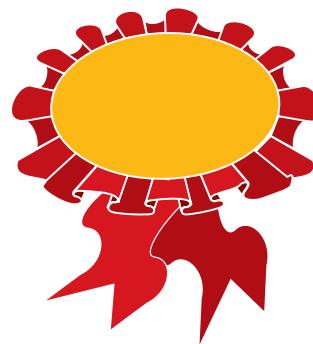
Polya Prize

Professor Harry Kesten is one of the 1994 co-recipients of the George Polya Prize, given for notable application of combinatorial theory over the five to ten years preceding the award. Professor Kesten will receive this honor at the SIAM Annual Meeting in San Diego, July 25-29, 1994.

Merrill Presidential Scholar

Merrill Presidential Scholars are graduating seniors who are honored for leadership and scholarship. As a tribute to the importance of teaching in shaping academic success, Merrill Scholars recognize their secondary school teachers who provided inspiration during their high school years. They also cite Cornell faculty who have "made the most significant contribution to their education" while at Cornell.

Mathematics Professor Robert Strichartz was named by mathematics major and Merrill Scholar Tong Zhang as one of these special Cornell faculty members.



Eleanor Norton York Award

Given annually to outstanding graduate students in mathematics and astronomy, this year the Eleanor Norton York Award's mathematics recipient is John Dalbec. Chosen for his promising work in computational algebraic geometry, Dalbec began his studies at Cornell in August 1990.

This year's astronomy recipient is Michael Smith.

Kieval Prize

The Harry S. Kieval Prize in Mathematics, established in 1984 by Harry S. Kieval '36, provides an annual award to outstanding graduating senior mathematics majors. Harry S. Kieval received the A.B. degree from Cornell with honors in mathematics, physics, and general studies. He later received his Ph.D. in mathematics from the University of Cincinnati, and spent most of his career teaching at Humboldt State University in California. Since retiring in 1979, he has actively encouraged the study of mathematics by funding prizes and lectures at Cornell.

This year the co-winners are William C. Dickinson and Tong Zhang. Dickinson plans to continue his studies in mathematics at the University of Pennsylvania this fall, while Zhang intends to study computer science at Stanford University. The Mathematics Department congratulates these two bright students, and hopes that the Kieval Prize continues to nourish and advance their interest in mathematics.

Putnam Competition

Cornell's team, under the guidance of Professor Robert Connelly, received an honorable mention at the 54th annual William Lowell Putnam Mathematics Competition, the national contest involving over 400 colleges and universities in Canada and the United States. This year's team was comprised of Robert Kleinberg, and math majors Mark Krosky and

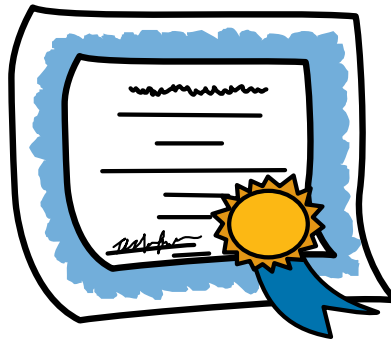
Tong Zhang. Kleinberg and Zhang also received honorable mentions for their individual performances. This year's event on December 4, 1993, included 2,356 student participants, and teams from 291 different institutions.

The Putnam Competition, established in 1938, promotes a healthful rivalry in mathematics between academic institutions across the United States and Canada. The Mathematical Association of America currently regulates the competition. The exam itself consists of twelve mathematical questions that the participants must solve during the course of an entire day.

The Mathematics Department congratulates all the Cornell participants.

Pi Mu Epsilon

Fifteen students were elected by the Mathematics Department to membership in Pi Mu Epsilon, the national honorary mathematics society which promotes scholarly activity in mathematics among students in academic institutions. The new members of Cornell's Theta chapter of Pi Mu Epsilon are: Bogomil Balkansky, David de la Nuez, Susan den Outer, William Dickinson, Robert Kleinberg, Varuni Kondagunta, Mark Krosky, Kori Kutch, Demetrio Muñoz, Mark Pilloff, Bradley Romine, Felix Rusli, Arthur Taylor, Xiao Yi Tian, and Tong Zhang.



Focus On:

Alumni News

Alan Hastings, '73, went on to get his M.S. ('75) and Ph.D. ('77) in Applied Math from Cornell. Currently he is Chair of the Division of Environmental Studies at the University of California at Davis. His research focuses on population genetics and ecological theory, including chaos in ecology.

John Klopp, a mechanical engineering grad of '53, writes that although he does not recall mathematics with great fondness while at Cornell, he has since "come to the realization that I should have paid more attention, as math is so central to making good engineering 'guesses'."

Lillian Lee, '93, "misses Cornell like crazy" while working towards a Ph.D. in computer science at Harvard University.

Bob Magee, '69, recalls the Mathematics Department faculty fondly, particularly Professor Cliff Earle. Now a professor (of accounting at Northwestern University) himself, he states that his "training in the Math Department provided a strong foundation for my research work in accounting."

Warren Walker, '63, writes that after receiving both his M.S. and Ph.D. degrees from Cornell in Operations Research, he is now a senior policy analyst at the RAND corporation. He works on policy studies for the U.S. government and the Netherlands' government in the areas of transportation, water management, criminal justice, and military personnel management.

Feel free to send any alumni news to *Math Matters*! We want to hear from you!

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